

LCD TELEVISION

SERVICE MANUAL

LC-32HC56

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Attention: This service manual is only for service personnel to take reference with. Before servicing please read the following points carefully.

Safety precautions

1. Instructions

Be sure to switch off the power supply before replacing or welding any components or inserting/plugging in connection wire. Anti static measures must be taken (throughout the entire production process!):

- a) Do not touch here and there by hand at will;
- b) Be sure to use anti static electric iron;
- c) It's necessary for the welder to wear anti static gloves.

Please refer to the part list before replacing components that have special safety requirements. Do not replace with different components with different specs and type at will.

2. LCD servicing precautions

2.1 Screens are different from one model to another and therefore not interchangeable. Be sure to use the screen of the original model for replacement.

2.2 The operation voltage of LCD screen is 700-825V. Be sure to take proper measures in protecting yourself and the machine when testing the system in the course of normal operation or right after the power is switched off. Please do not touch the circuit or the metal part of the module that is in operation mode. Relevant operation is possible only one minute after the power is switched off.

2.3 Do not use any adapter that is not identical with the TV set. Otherwise it will cause fire or damage to the set.

2.4 Never operate the set or do any installation work in bad environment such as wet bathroom, laundry, kitchen, or nearby fire source, heating equipment and devices or exposure to sunlight etc. Otherwise bad effect will result.

2.5 If any foreign substance such as water, liquid, metal slices or other matters happens to fall into the module, be sure to cut the power off immediately and do not move anything on the module lest it should cause fire or electric shock due to contact with the high voltage or short circuit.

2.6 Should there be smoke, abnormal smell or sound from the module, please shut the power off at once. Likewise, if the screen is not working after the power is on or in the course of operation, the power must be cut off immediately and no more operation is allowed under the same condition.

2.7 Do not pull out or plug in the connection wire when the module is in operation or just after the power is off because in this case relatively high voltage still remains in the capacitor of the driving circuit. Please wait at least one minute before the pulling out or plugging in the connection wire.

2.8 When operating or installing LCD please don't subject the LCD components to bending, twisting or extrusion, collision lest mishap should result.

2.9 As most of the circuitry in LCD TV set is composed of CMOS integrated circuits, it's necessary to pay attention to anti statics. Before servicing LCD TV make sure to take anti static measure and ensure full grounding for all the parts that have to be grounded.

2.10 There are lots of connection wires between parts behind the LCD screen. When servicing or moving the set please take care not to touch or scratch them. Once they are damaged the screen

would be unable to work and no way to get it repaired.

If the connection wires, connections or components fixed by the thermotropic glue need to disengage when service, please soak the thermotropic glue into the alcohol and then pull them out in case of damage.

2.11 Special care must be taken in transporting or handling it. Exquisite shock vibration may lead to breakage of screen glass or damage to driving circuit. Therefore it must be packed in a strong case before the transportation or handling.

2.12 For the storage make sure to put it in a place where the environment can be controlled so as to prevent the temperature and humidity from exceeding the limits as specified in the manual. For prolonged storage, it is necessary to house it in an anti-moisture bag and put them altogether in one place. The ambient conditions are tabulated as follows:

Temperature	Operation range	0 ~ +50 °C
	Storage range	-20 ~ +60 °C
Humidity	Operation range	20% ~ 85%
	Storage range	10% ~ 90%

2.13 Display of a fixed picture for a long time may cause a permanent after-image on the screen, as commonly called "ghost shadow". The degree of the after-image varies with the maker of LCD screen. This phenomenon doesn't represent failure. This "ghost shadow" may remain in the picture for a period of time (several minutes). But when operating it please avoid displaying still picture in high brightness for a long time.

3. Installation precautions

3.1 The front panel of LCD screen is made of glass. When installing it please make sure to put it in place.

3.2 For service or installation it's necessary to use specified screw lest it should damage the screen.

3.3 Be sure to take anti dust measures. Any foreign substance that happens to fall down between the screen and the glass will affect the receiving and viewing effect

3.4 When dismantling or mounting the protective partition plate that is used for anti vibration and insulation please take care to keep it in intactness so as to avoid hidden trouble.

3.5 Be sure to protect the cabinet from damage or scratch during service, dismantling or mounting.

Alignment instructions

1. Test equipment

PM5518 (video signal generator)
VG-848 (VGA, HDMI signal generator)
CA210 (color analyzer)
PC (for writing HDCP KEY)

2. Alignment flow-chart

The alignment flow-chart is shown as fig-1

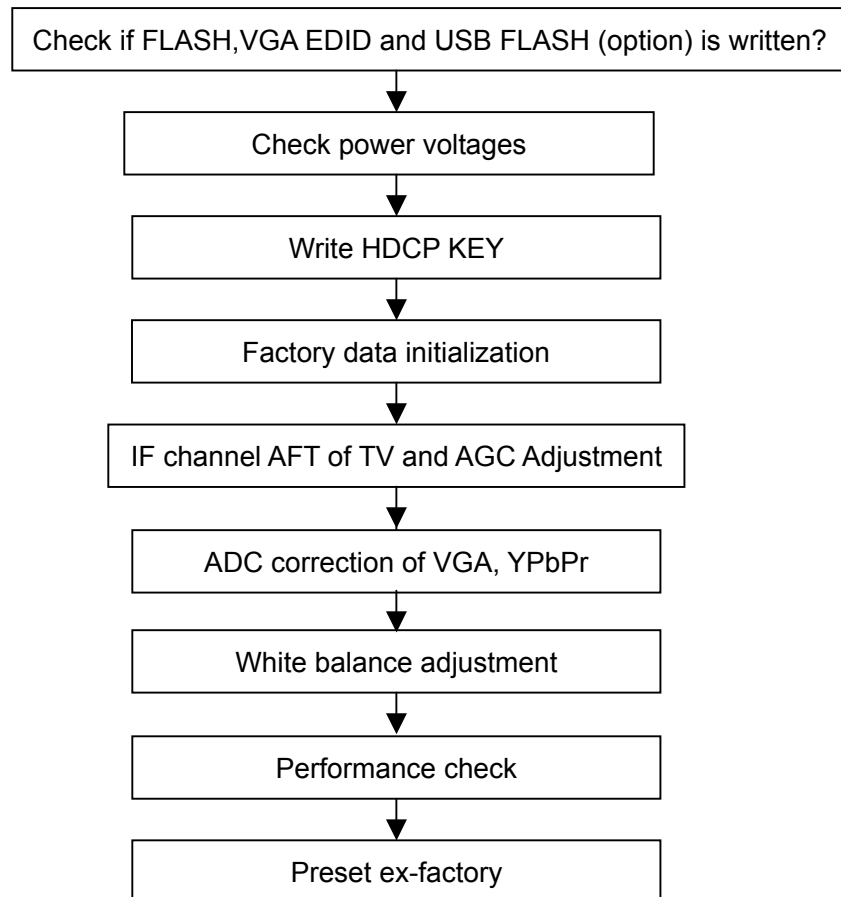


Fig-1 adjustment flow-chart

3. Alignment instruction

Before alignment check if the program is written? Please refer to the software instruction (table3).

3.1 Power check

Connect all the boards according to wiring diagram. Check 5V-STB at standby, tuner 32V at power on and backlight 24V.

3.2 Alignment

Connect all the boards according to wiring diagram then power on and check if the display is normal?

Method for entering factory menu: press “INPUT”, “2”, “5”, “8” and “0” in turn to enter factory menu; press “CH+” or “CH-” to select adjustment items and press “VOL+” or “VOL-” to adjust value items, press “MENU” repeatedly to exit. Set AGING MODE of the factory menu to ON, AGING MODE icon will display on the top left of the screen, now you can press “NR” button to enter the factory menu.

Method for software upgrading: Prepare the software upgrade program and set the software upgrade tool correctly, press CONNECT then power on, the program will upgrade automatically. After system prompts upgrade success, press EXIT to exit. When REALTEK appear, it means the upgrade is complete, then restart the unit.

3.3 Write HDCP KEY

Turn on the PC and set the software tool correctly, click HDCP then turn on the unit, the program will be written automatically. It needs about 5s and after finish, system will prompt upgrade success.

Note: HDCP button can only be pressed one time for one unit.

The power should be off and 5V-STB disappear for 5s then start writing.

3.4 Initialization

Enter factory menu, press “CH+” or “CH-” to select adjustment items and press “VOL+” or “VOL-” to enter the sub menu or adjust value items, adjustment items are shown in table1.

Table1 sub-menu adjustment

Items	Preset	Remarks
HOTEL OPT	OFF	ON: HOTEL OPTION of factory menu is available OFF: HOTEL OPTION of factory menu is unavailable.
BACK LIGHT	0	Software will preset the data according the type of panel
LOGO OPTION	ON	ON: display LOGO when no signal is received or power on OFF: no LOGO display
AGING MODE	OFF	OFF: power off when no signal ON: aging mode
POWER MODE	0	0: standby 1: power on 2: memory
TEMP ADJUST→ ALL COLOR	OFF	ON: white balance of each channel auto offset based on the HDMI white balance 0: white balance of each channel adjust the offset base separately
RESET		RESET Initialization (operate when EEPROM data chaos)

3.5 Adjustment for AFT voltage and AGC voltage of IF channel in TV

3.5.1 IF amplifier AFT alignment

Enter factory menu and set IFVCO to 1, enter VCO adjustment mode, disconnect J401, adjust L421 and let AFT voltage be $2.5V \pm 0.1V$ and the test points are TP104(B face), TP105(A face). Then set IF VCO to 0, power off the unit and solder J401. (22”: L413, TP404(B face), TP403(A face); 26”: L412, TP404(B face), TP403(A face)).

3.5.2 IF amplifier AGC alignment

Input 184.25MHz, 60dB RF signal for China or 175.25MHz, 60dB for America, adjust RP401 to let AGC voltage be 3.3V (3.1V minimum, 3.4V maximum), the test points are TP101(B face), TP102(A face) and there should be no obvious snowy picture. Increase the signal to 90dB and it should be display normally and no obvious noise. (test points of 22”, 26” are TP401(B face), TP402(A face)).

3.6 White balance adjustment

3.6.1 white balance adjustment of HDMI

a. Input VG-848 signal to HDMI port: TIMING854 (800x600/60Hz) and eighth-level gray scale signal of PAT920. Use color analyzer CA210 to adjust white balance.

b. Enter factory submenu of TEMP ADJUST, Select NORMAL color temperature (9300k), fixed value of B OFF, adjust R OFF and G OFF, let the color coordinate of the second level be $(285\pm 8, 293\pm 12)$. Fixed value of B GAIN, adjust R GAIN and G GAIN, let the color coordinate of the seventh level be $(285\pm 4, 293\pm 6)$. Adjustment R OFF, G OFF, R GAIN and G GAIN repeatedly until the value of the two levels gray-scale are (285, 293), then set ALL COLOR to ON.

3.6.2 VGA/YPBPR/AV white balance check and correction

a. Input VG-848 signal of VGA to VGA terminal: TIMING854(800x600/60Hz) (PATTERN:CROSS) and auto adjust to full screen, then input PAT948 black/white signal, enter factory menu ADC ADJ, select AUTO COLOR and the system will correct automatically, after finish, it will return to AUTO COLOR menu. Please check the picture and data, if they are abnormal, then the correction is failure and needs to correct again. (abnormal symptom: certain of the data are greatly different from other data or exceed or near 1000).

Input PAT920(8 gray levels), check if the white balance is normal, if not, enter TEMP ADJUST menu and set ALL COLOR to OFF and fine adjust according the method of 3.6.1c)

b. SD correction: input VG-848 signal of YPBPR to YPBPR terminal and input TIMING968 (480i) PAT968 color bar (see fig2), (color from left to right are white- yellow- cyan- green- purple- red- blue- black), enter ADC ADJ submenu, select AUTO COLOR the system will correct automatically, after finish, it will return to AUTO COLOR menu. Please check the picture and data, if they are abnormal, then the correction is failure and needs to correct again.

HD correction: input VG-848 signal of YPBPR to YPBPR terminal and input TIMING976 (720P/60Hz) PAT968 color bar (color from left to right are white- yellow- cyan- green- purple- red- blue- black), enter ADC ADJ submenu, select AUTO COLOR the system will correct automatically, after finish, it will return to AUTO COLOR menu. Please check the picture and data, if they are abnormal, then the correction is failure and needs to correct again.

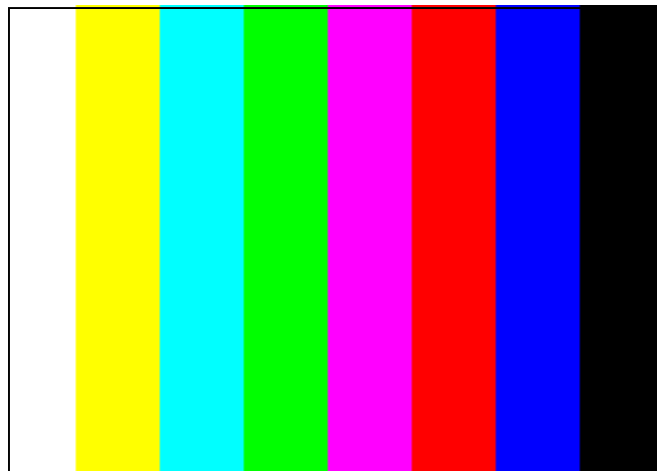


fig2

Input PAT920(8 gray levels), check if the white balance is normal, if not, enter TEMP ADJUST menu and set ALL COLOR to OFF and fine adjust according the method of 3.6.1c)

c. Input AV signal (PM5518, 8 gray levels, PAL for China and NTSC for America) to VIDEO1 terminal, check if the white balance is normal, if not, set ALL COLOR to OFF and fine adjust according the method of 3.6.1c)

Note: it can't set back to ON once ALL COLOR changes to OFF. The adjustment of other color temperature refer to 3.6.

4. Performance check

4.1 TV function

Enter tuning menu → auto search, connect RF-TV terminal with central signal source and check if the picture is normal, if there are channels not found. Check CCD and V-CHIP(for America).

4.2 AV/S, YPbPr jacks

Input AV/S, YPbPr/YCbCr HD signal, check if it is normal.

4.3 VGA jack

Connect VGA jack, input 640 x 480/60Hz standard signal and check if the display is normal.

4.4 HDMI jack

Connect HDMI jack, input 640 x 480/60Hz standard signal and check if the display is normal.
Check if HDCP is normal?

4.5 Check sound channel

Check the speaker and earphone output of each channel.

4.6 Other function check

Check the ON/OFF timer, sleep timer, picture/sound mode, OSD, freeze/mute, USB(option), MAG.G feature, etc.

4.7 Presetting before ex-factory

Table2 ex-factory setting

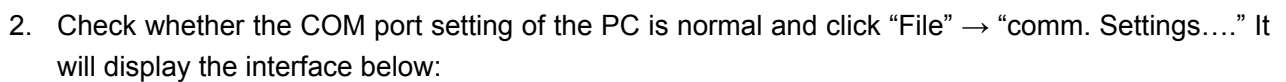
Item	Setting	Item	Setting	Item	Setting
PICTURE MODE	NAUTRAL				
SOUND SYSTEM	DK (China), or others (depending the local area)	LANGUAGE	English		
SOUND MODE	NEWS	TRANSPARENCY	2	VGA/HDMI COLOR TEMP	STANDARD
NR	WEAK	OSD TIME	10	ANTENNA	CATV
ZOOM	FULL				

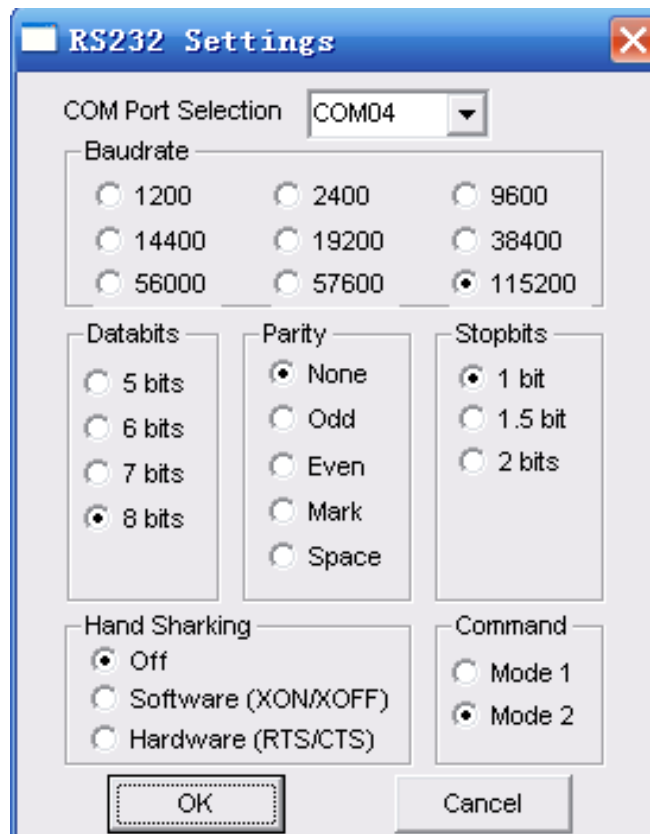
5. Software instruction

Table3 software instruction

No.	Code No.	Type	Function	Written before paste	Method	Remarks
NS3	5272540001	PM25VF040	Main CPU program	Yes	Written instrument with like ALL11	22": N203 26": N501
NB1	5272402002	24C02N-10SI27	VGA EDID	Yes		22": N107 26": N108
NU3	5272501601	S25FL016AOLMF	USB program	Yes		

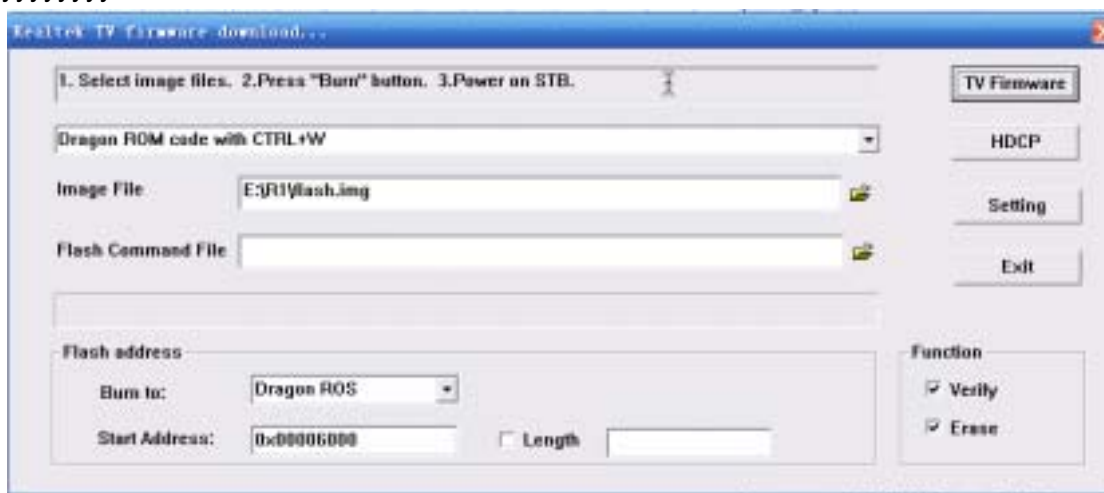
1. Open upgrade tool “RTICE” and display the interface below:



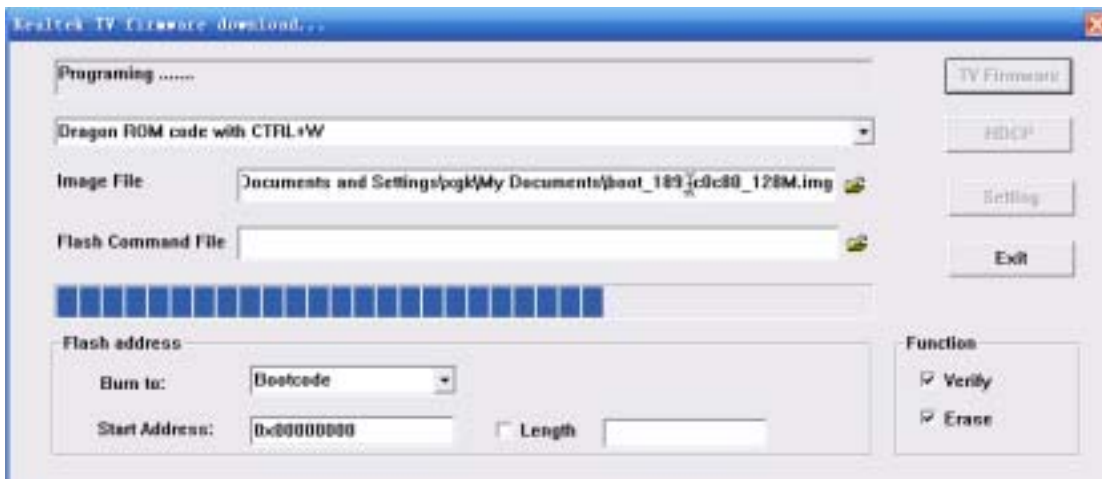


Select COM port of your PC in "COM Port Selection". For example, if my PC COM port is COM4, I will select COM4 and set the others items as shown above.

- After setting, press and hold "CTRL+W" button on your computer and at the same time press power button on the unit to power on. It is proved that serial ports are well connected when display "yyyyyyyyyy". Then click "Burn in Romcode" to enter the interface below:



- Select "bootcode" software from "Image File", the normal name is "boot.img", then select "Boot code" from "Burn to" and finally click "TV Firmware" to display the below interface.



After appearing “Verify success” on the top line, it means burn in success. Please don’t do anything here because the main CPU software will be burn in later.

5. Select the flash file from “Image File” which named “flash.img” normally and select “Dragon ROS” from “Burn to”, then click “TV Firmware” to display the below interface:



after burning, you can restart the unit.

Working principle analysis of the unit

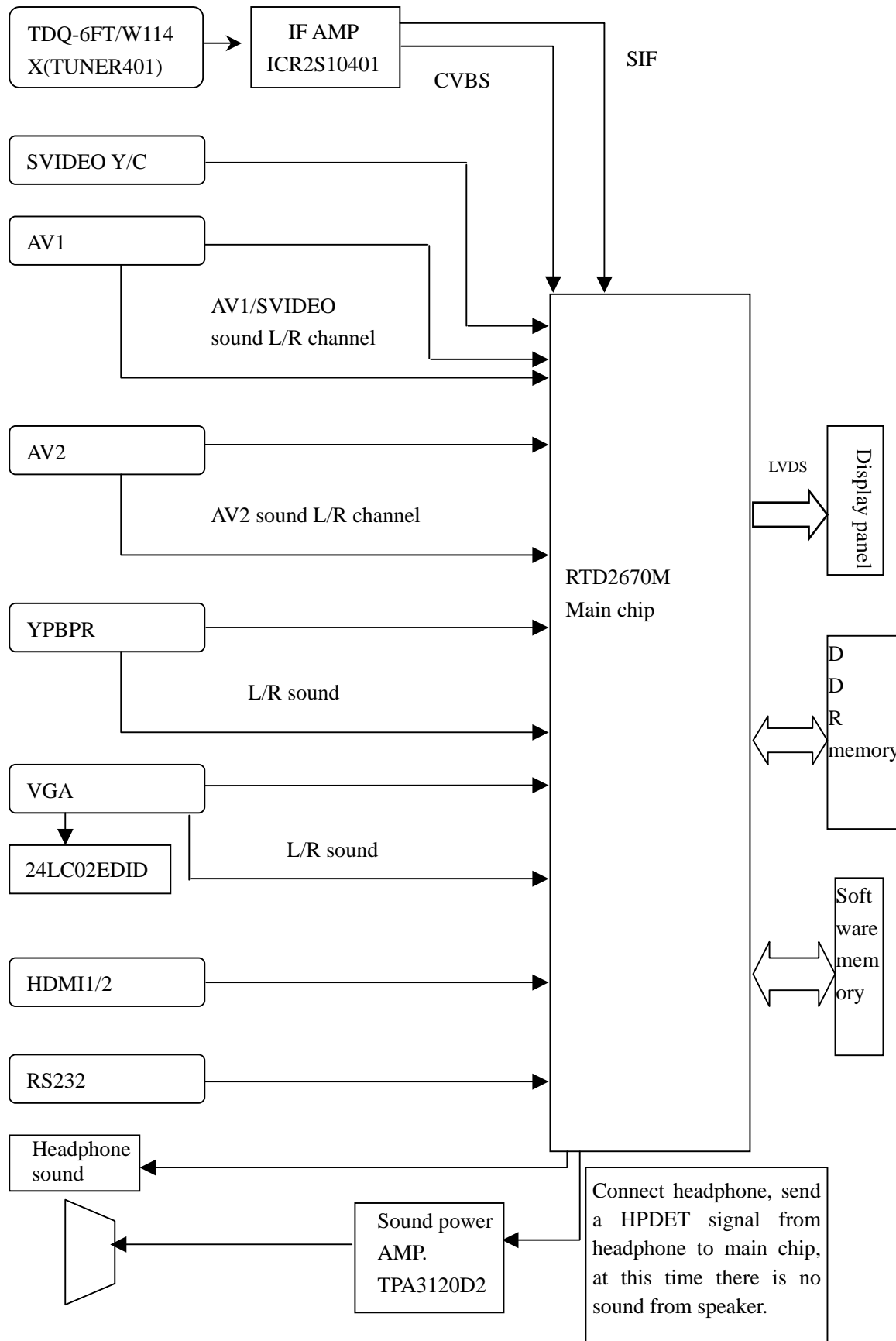
The RF signal received from antenna will be sent to TUNER, then IF signal will be obtained through high amplifier and mixed frequency, through pre-intermediate amplified by V406, it will be sent to SAW filter Z2 to IF filter and get better IF characteristics, then to NS6 (R2S1040) for intermediate amplification, phase-locked loop VCO and synchronous wave detection and get video signal TV-CVBS; after pre-intermediate amplification IF will also be sent to SAW filter Z1 to filter at the same time, then it will be sent to NS6 to intermediate amplify and output the second sound intermediate frequency signal TV-SIF. TV-CVBS and TV-SIF output from NS6 will be sent into main chip NS1 (RTD2670).

Video and audio signals of AV1, AV2, S-VIDEO and YPbPr will be sent to main chip NS1. Video and audio signals of VGA, HDMI1, HDMI2 will be sent to NS1, too.

The main chip NS1 is a high performance and fully integrated IC, which can realize HDMI interface processing, video decoding, video switch selection, A/D and D/A conversion, interlace/progressive processing, modes conversion, OSD and low-voltage differential output, etc. And it also has functions of audio selection, processing and MCU feature. Video via RTD2670 processing will send 4 pairs differential signals and 1 pair clock signal to panel display.

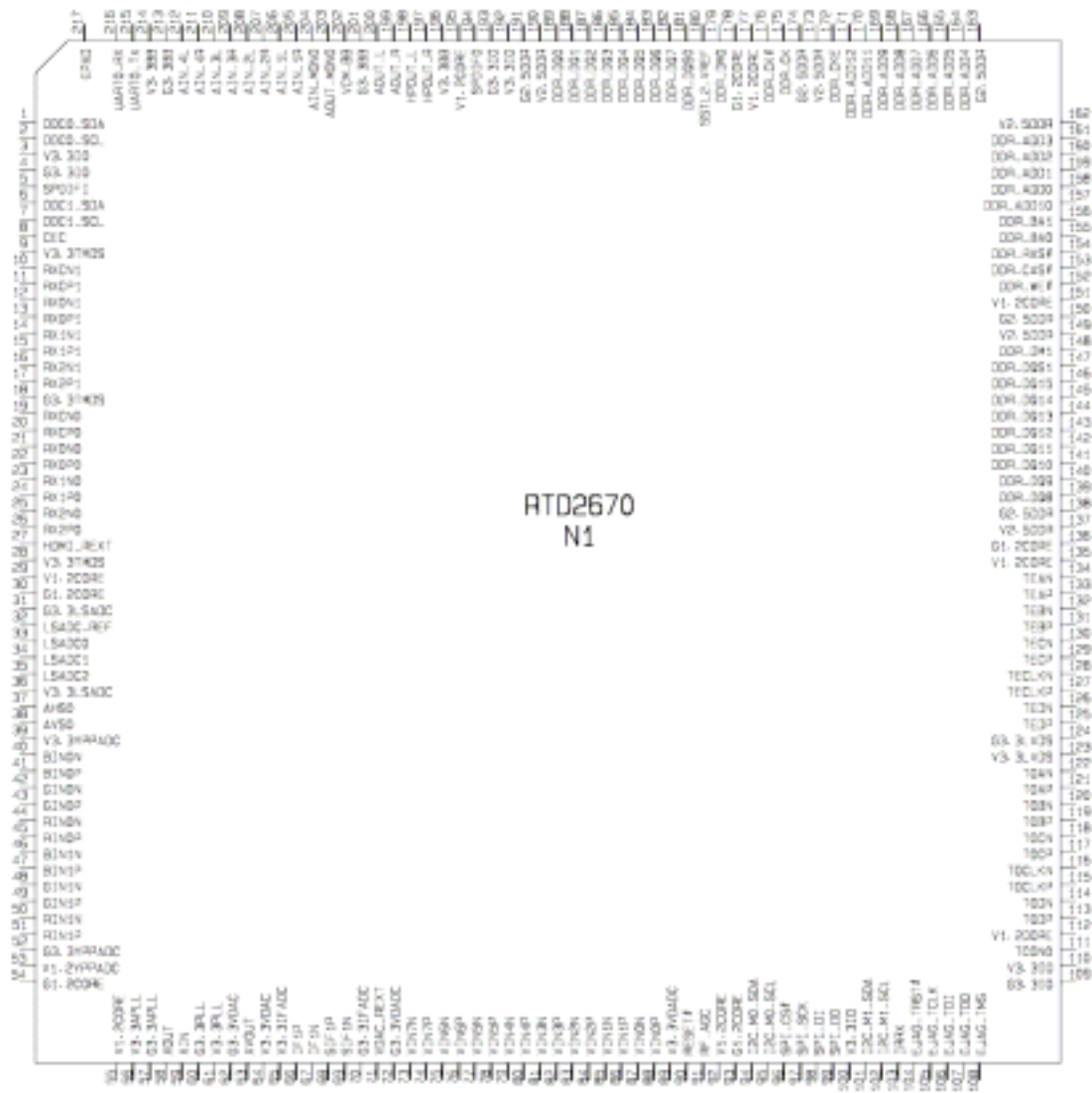
Audio signal via NS1 processing will be sent to sound amplifier NS5 (TPA3120D2) to amplify then sent to speaker.

Block diagram (for model without USB port)



IC block diagram

1. RTD2670 (main IC)

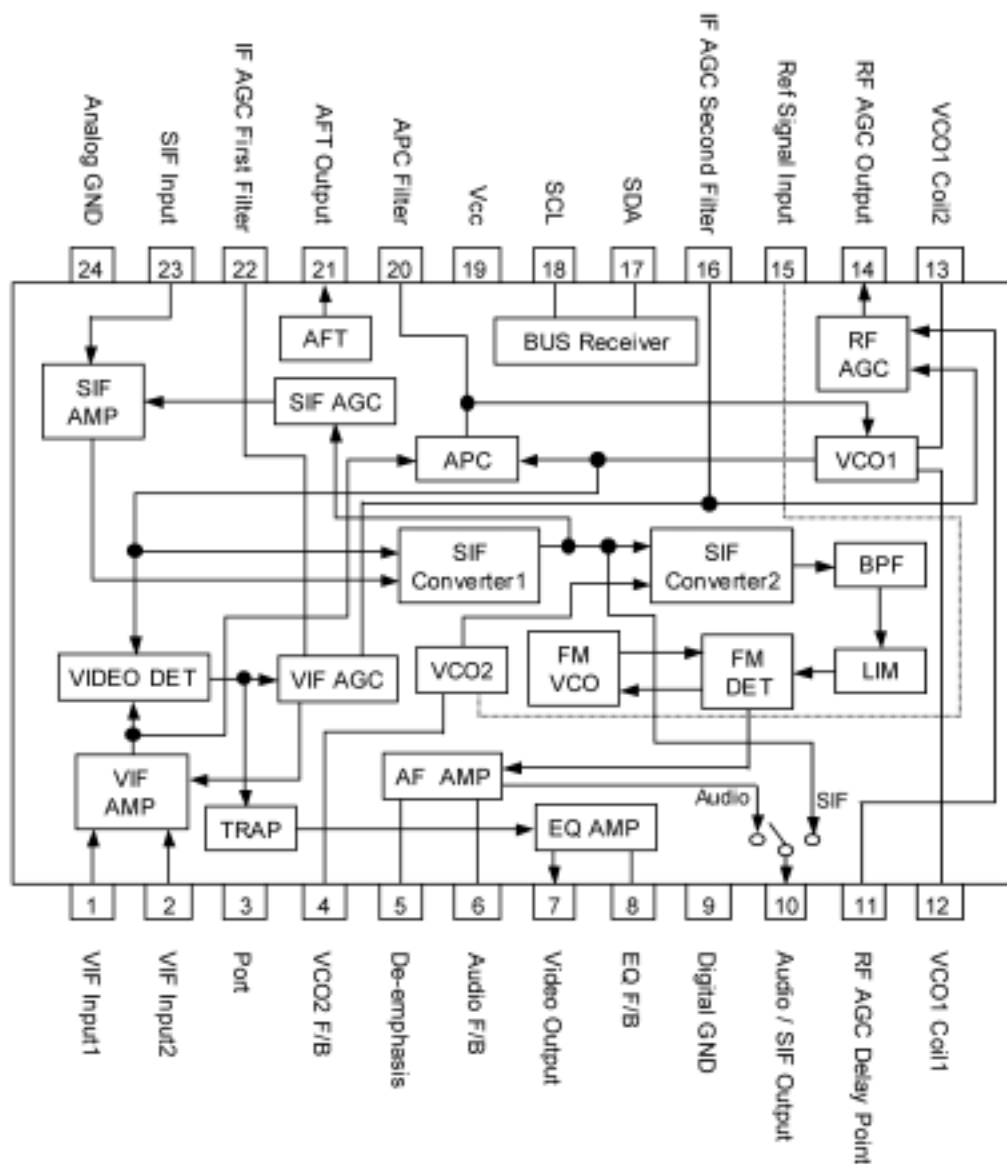


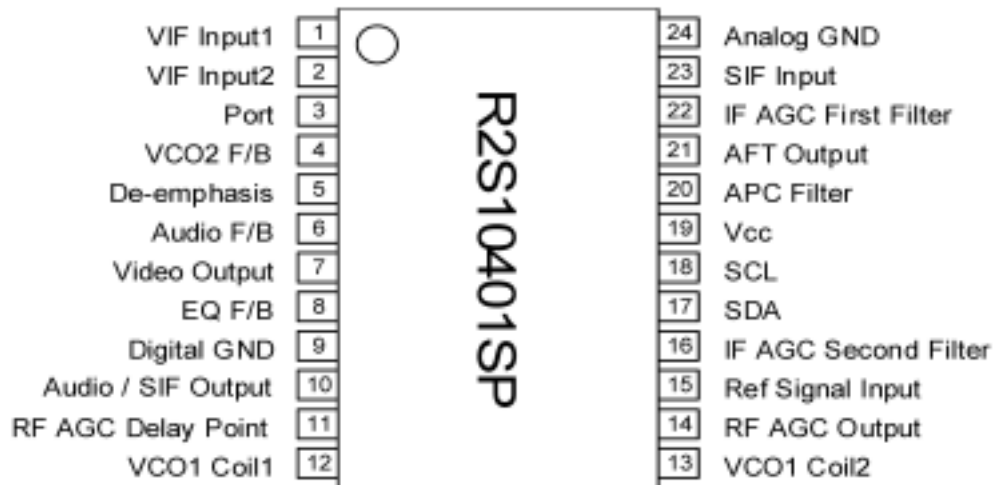
Pin description :

10-17: HDMI1 input
 19-26: HDMI0 input
 104: Horizontal SYNC input
 37,38: VGA L/R input
 58,59: external crystal vibrato
 81,82: AV1 Y input
 96-99: SPI bus
 101: SDA
 102: SCL
 211,212: AV1 L/R
 209,210: AV2 L/R

207, 208: VGA L/R
 205, 206: YPBPR L/R
 87,88: TUNER CVBS input
 46-51: YPBPR input
 40-45: VGA input
 79,80: AV2 Y input
 83,84,85,86: SVEDIO input
 113-134: panel wires
 108: backlight control
 106: mute

2. R2S10401 (IF amplifier IC)

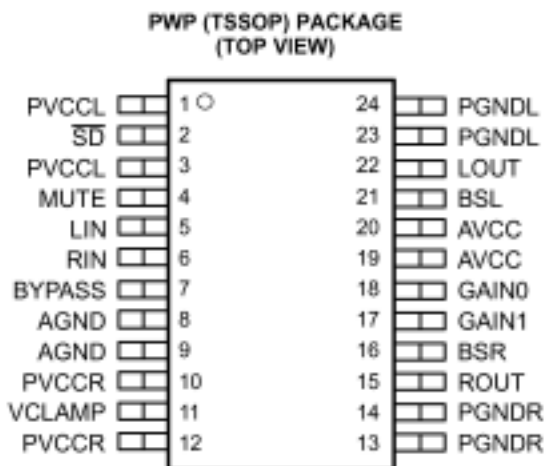




Pin description :

- 1,2: VIF input
- 23: SIF input
- 7: TV-CVBS output
- 10: TV-SIF output
- 17: SDA
- 18 : SCL

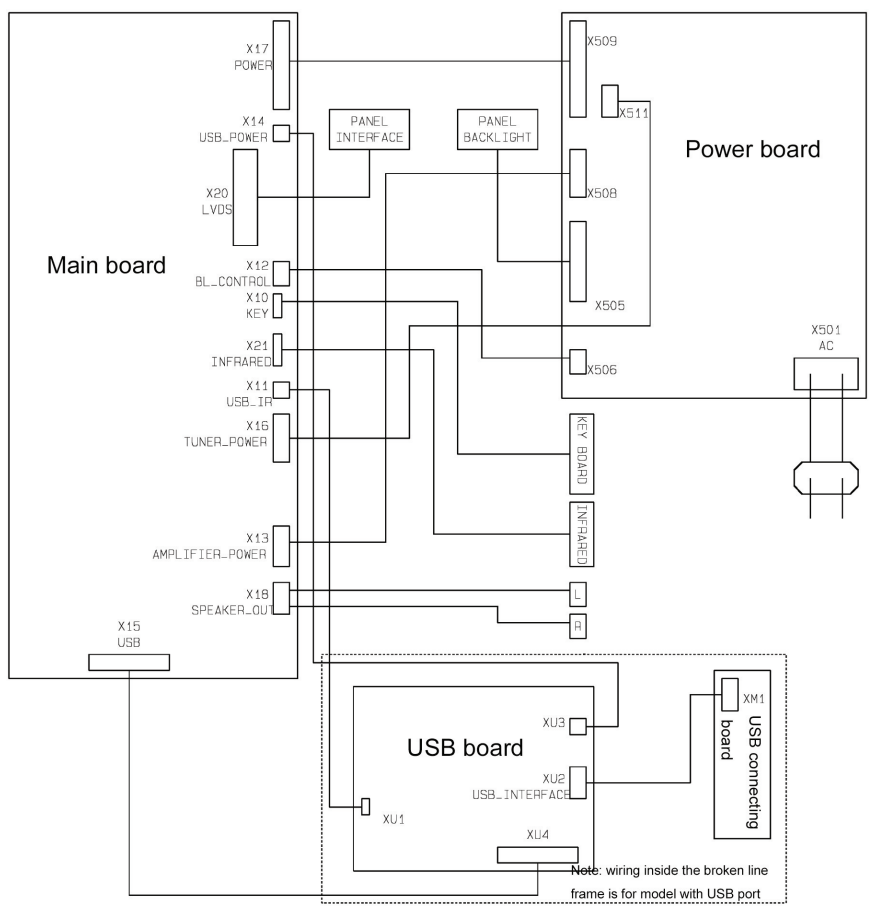
3. TPA3120D2 (Sound power amplification)



Pin description:

- 5,6: L/R input
- 22,15: L/R output
- 4: mute

Wiring diagram



Trouble shooting

1. Fault clearance

Before servicing please check to find the possible causes of the troubles according to the table below.

1.1 Antenna (signal):

Picture is out of focus or jumping	<ul style="list-style-type: none"> ● Bad status in signal receiving ● Poor signal ● Check if there are failures with the electrical connector or the antenna. ● Check if the antenna is properly connected.
Fringe in picture	<ul style="list-style-type: none"> ● Check if the antenna is correctly oriented. ● Maybe there is electric wave reflected from hilltop or building.
Picture is interfered by stripe shaped bright spots	<ul style="list-style-type: none"> ● Possibly due to interference from automobile, train, high voltage transmission line, neon lamp etc. ● Maybe there is interference between antenna and power supply line. Please try to separate them in a longer distance. ● Maybe the shielded-layer of signal wire is not connected properly to the connector.
There appear streaks or light color on the screen	<ul style="list-style-type: none"> ● Check if interfered by other equipment and if interfered possibly by the equipment like transmitting antenna, non-professional radio station and cellular phone.

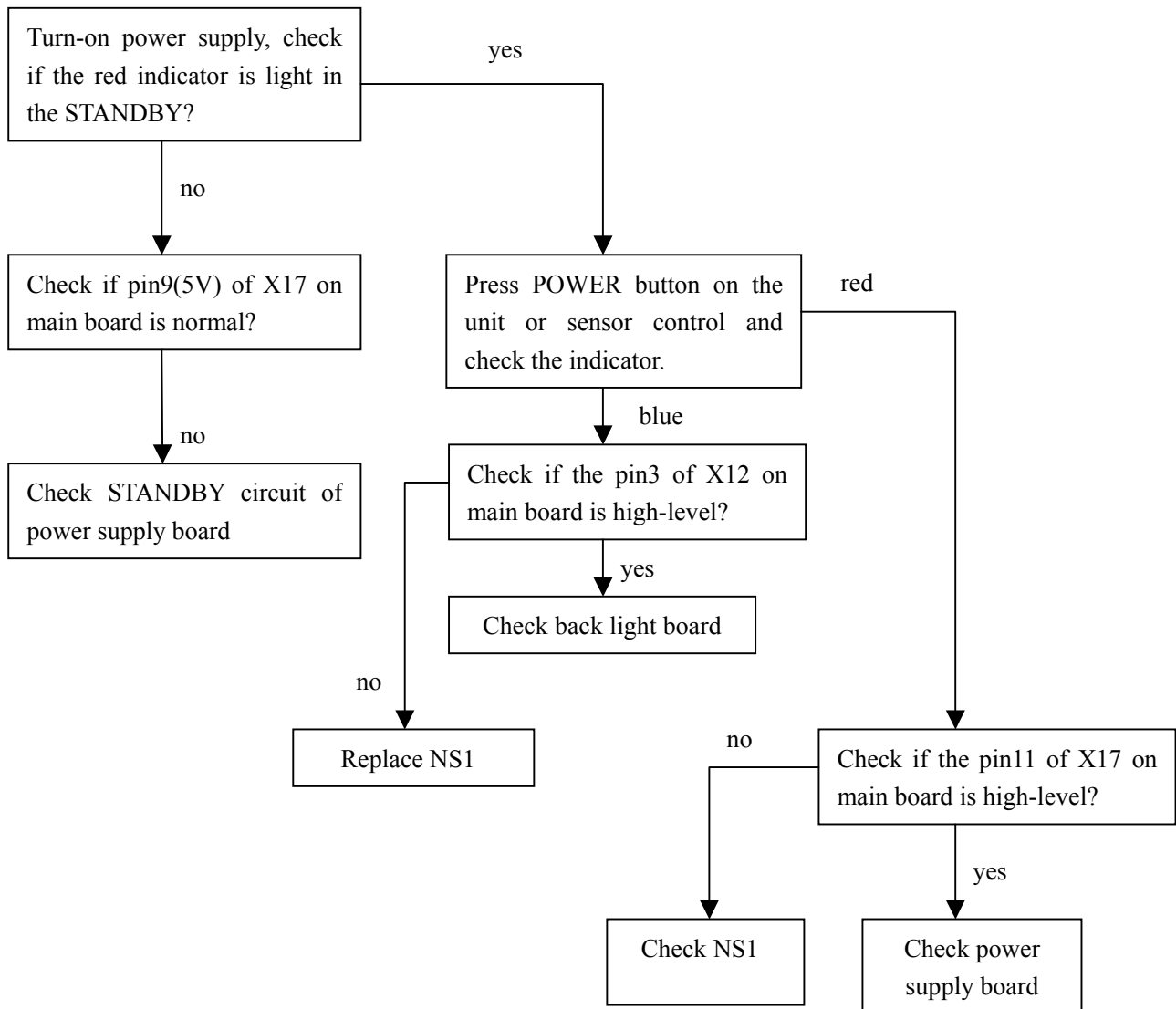
1.2 TV set:

Symptoms	Possible cause
Unable to switch the power on	<ul style="list-style-type: none"> ● Check to see if the power plug has been inserted properly into the socket.
No picture and sound	<ul style="list-style-type: none"> ● Check to see if the power supply of liquid crystal TV has been switched on. (As can be indicated by the red LED at the front of the TV set) ● See if it's receiving the signal that is transmitted from other source than the station ● Check if it's connected to the wrong terminal or if the input mode is correct. ● Check if the signal cable connection between video frequency source and the liquid crystal TV set is correct.
Deterioration of color phase or color tone	<ul style="list-style-type: none"> ● Check if all the picture setups have been corrected.
Screen position or size is not proper	<ul style="list-style-type: none"> ● Check is the screen position and size is correctly set up.
Picture is twisted and deformed	<ul style="list-style-type: none"> ● Check to see if the picture-frame ratio is properly set up.
Picture color changed or colorless	<ul style="list-style-type: none"> ● Check the "Component" or "RGB" settings of the liquid crystal TV set and make proper adjustment according to the

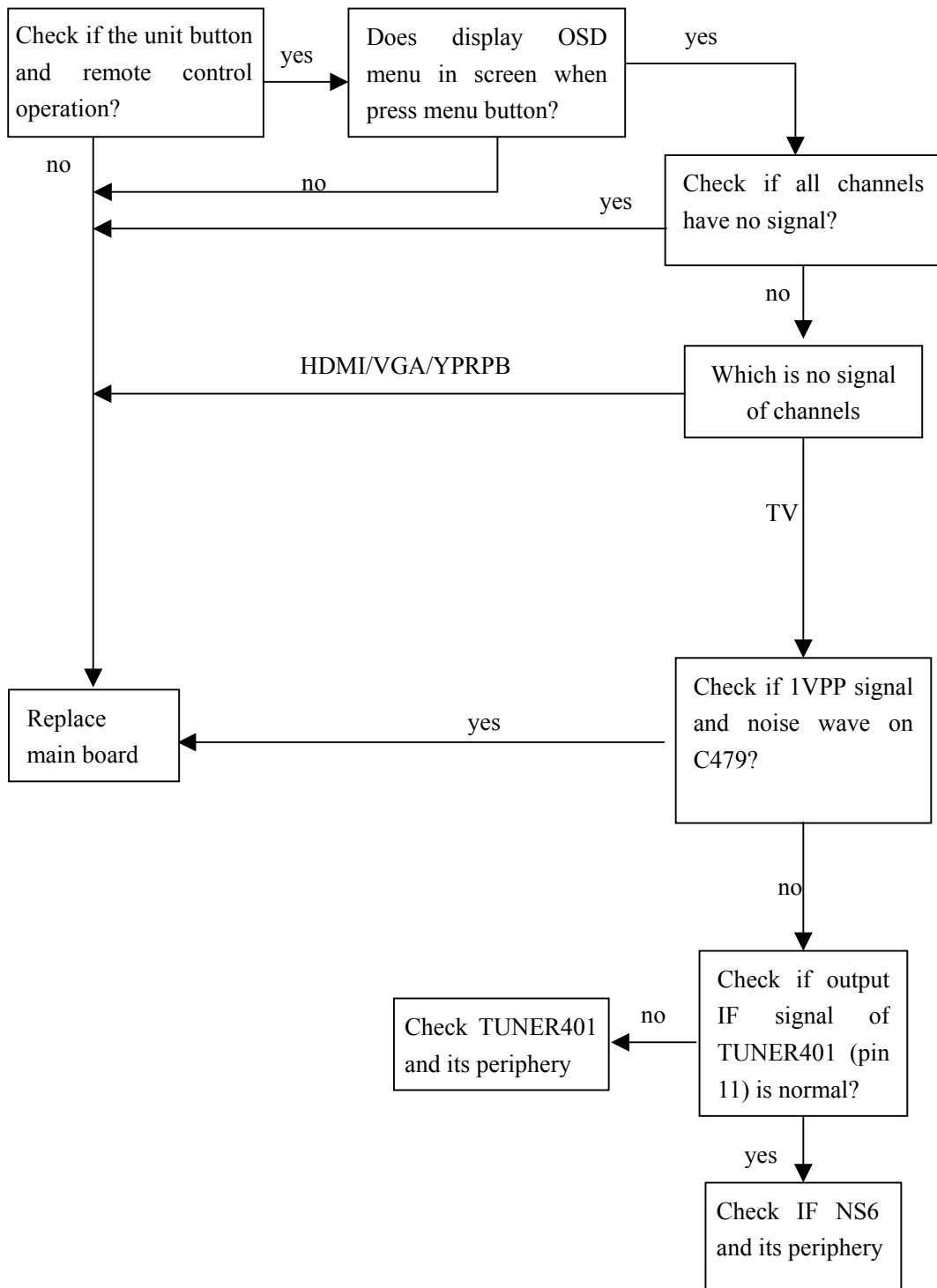
	signal types.
Picture too bright and there is distortion in the brightest area	<ul style="list-style-type: none"> ● Check if the contrast setting is too high. ● Possibly the output quality of DVD broadcaster is set too high. ● It maybe also due to improper terminal connection of the video frequency signal in a certain position of the system.
Picture is whitish or too bright in the darkest area of the picture	<ul style="list-style-type: none"> ● Check if the setting for the brightness is too high ● Possibly the brightness grade of DVD player (broadcaster) is set too high.
No picture or signal produced from the displayer if “XXX in search” appears.	<ul style="list-style-type: none"> ● Check if the cable is disconnected. ● Check if it's connected to the proper terminal or if the input mode is correct.
There appears an indication - “outside the receivable scope)	<ul style="list-style-type: none"> ● Check if the TV set can receive input signal. The signal is not correctly identified and VGA format is beyond the specified scope.
Remote control cannot work properly	<ul style="list-style-type: none"> ● Check if the batteries are installed in the reverse order. ● Check if the battery is effective. ● Check the distance or angle from the monitor. ● Check if there is any obstruct between the remote control and the TV set. ● Check if the remote control signal- receiving window is exposed to strong fluorescence.
No picture and sound, but only hash.	<ul style="list-style-type: none"> ● Check if the antenna cable is correctly connected, or if it has received the video signal correctly.
Blur picture	<ul style="list-style-type: none"> ● Check if the antenna cable is correctly connected. ● Of if it has received the right video signal.
No sound	<ul style="list-style-type: none"> ● Check if the “mute” audio frequency setting is selected. ● Check if the sound volume is set to minimum. ● Make sure the earphone is not connected. ● Check if the cable connection is loose.
When playing VHS picture search tape, there are lines at the top or bottom of the picture.	<ul style="list-style-type: none"> ● When being played or in pause VHS picture search tape sometimes can't provide stable picture, which may lead to incorrect display of the liquid crystal TV, In this case please press “auto” key on the remote control so as to enable the liquid crystal TV set to recheck the signal and then to display correct picture signal

2. Troubleshooting guide

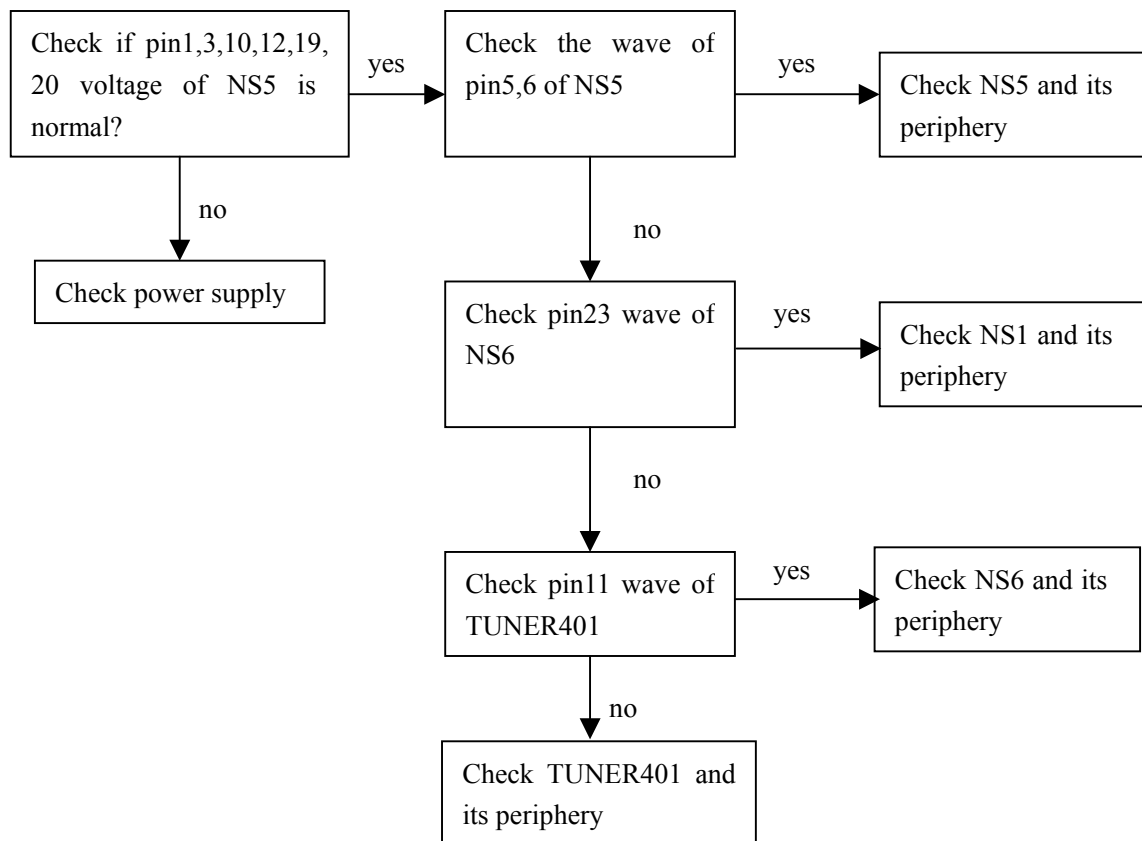
2.1. No raster

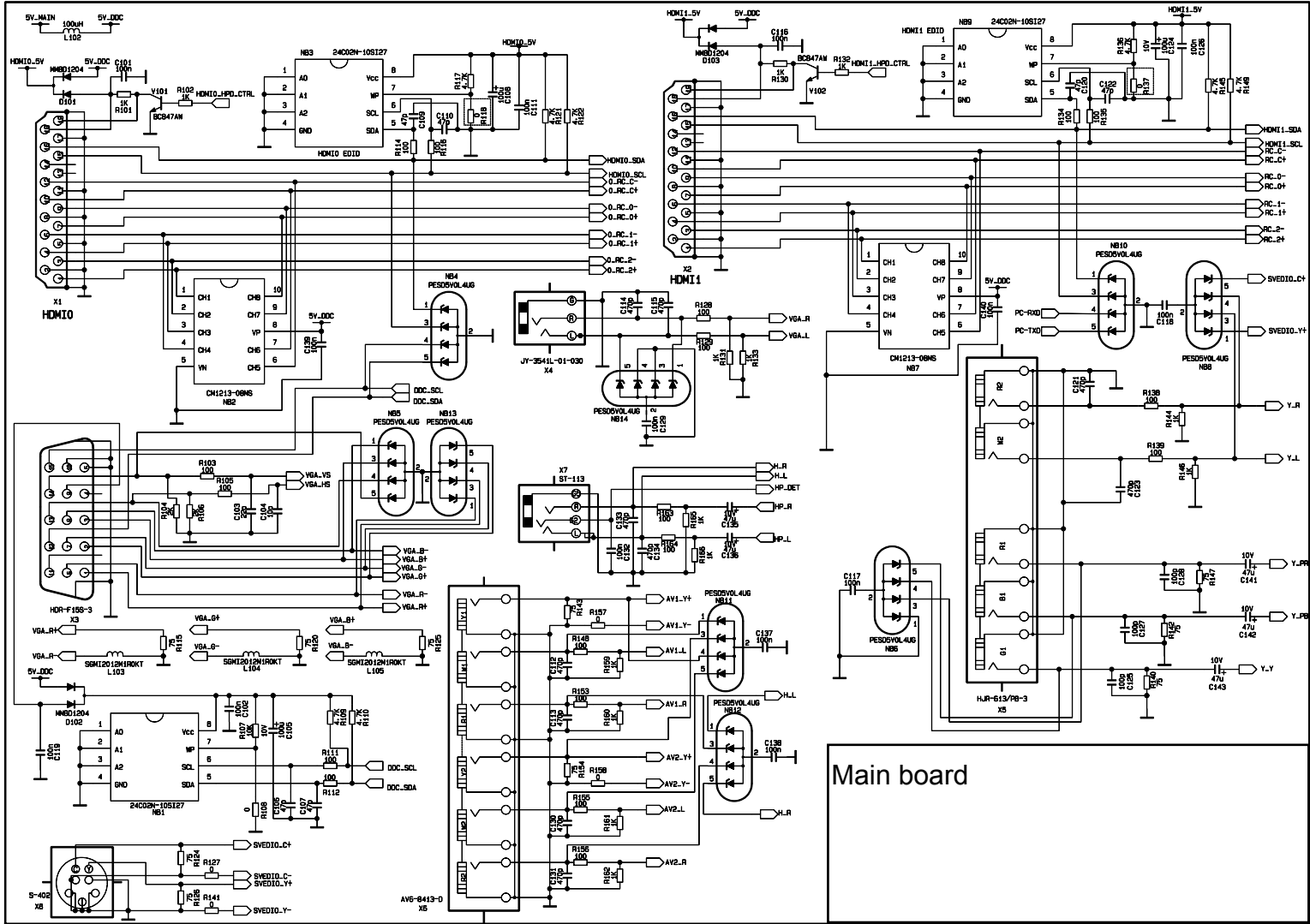


2.2. Raster, but no picture

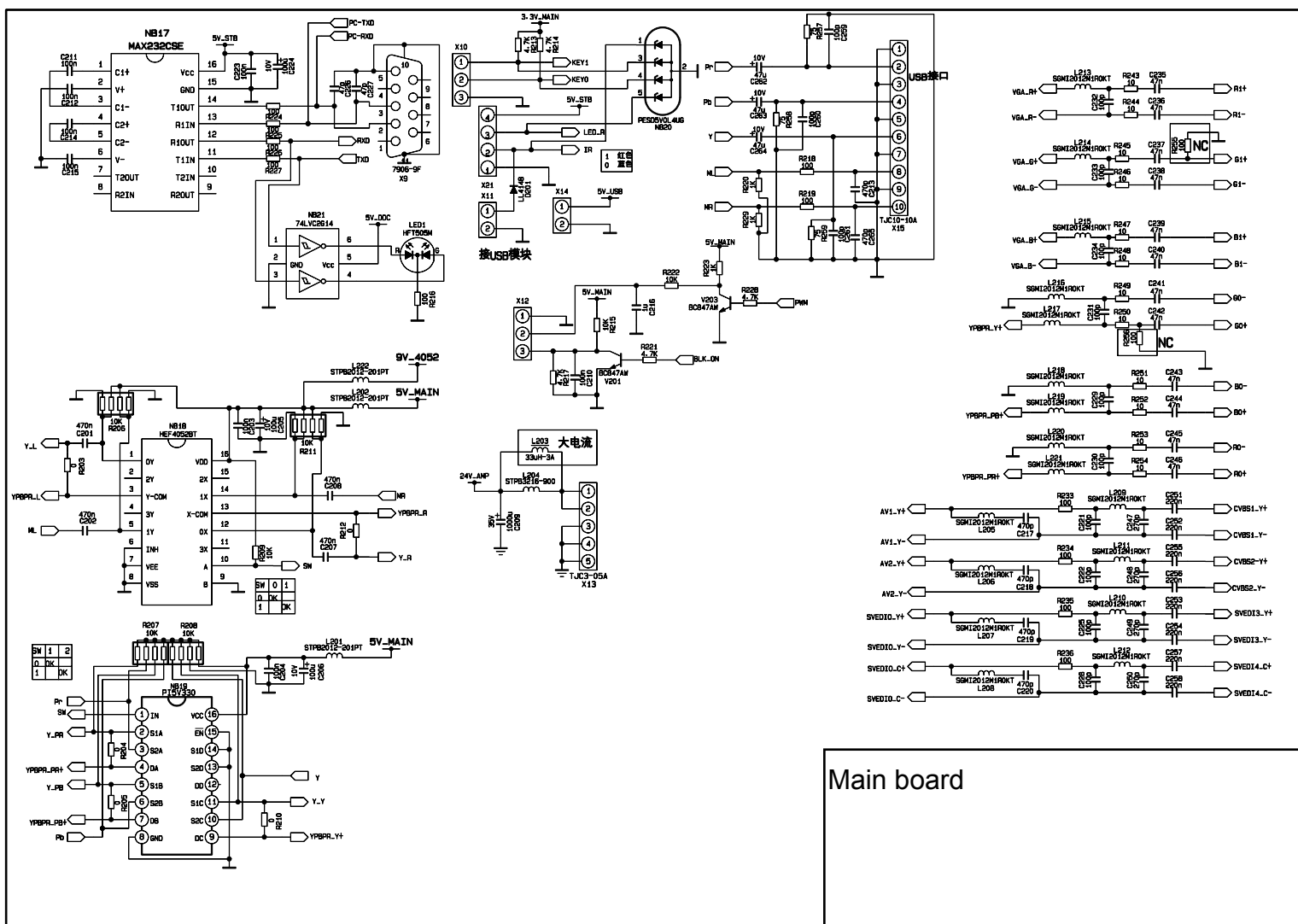


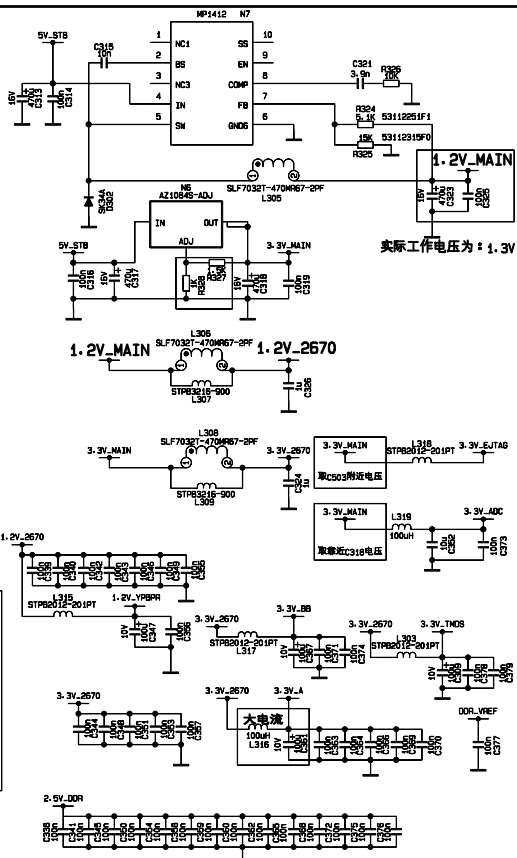
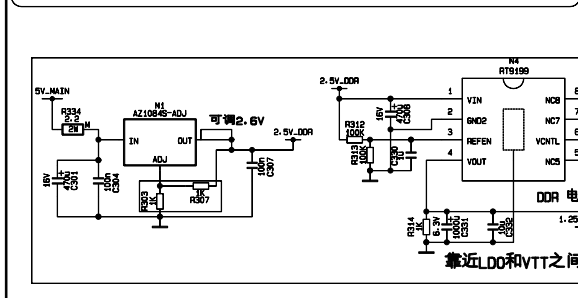
2.3.no sound (TV for example)

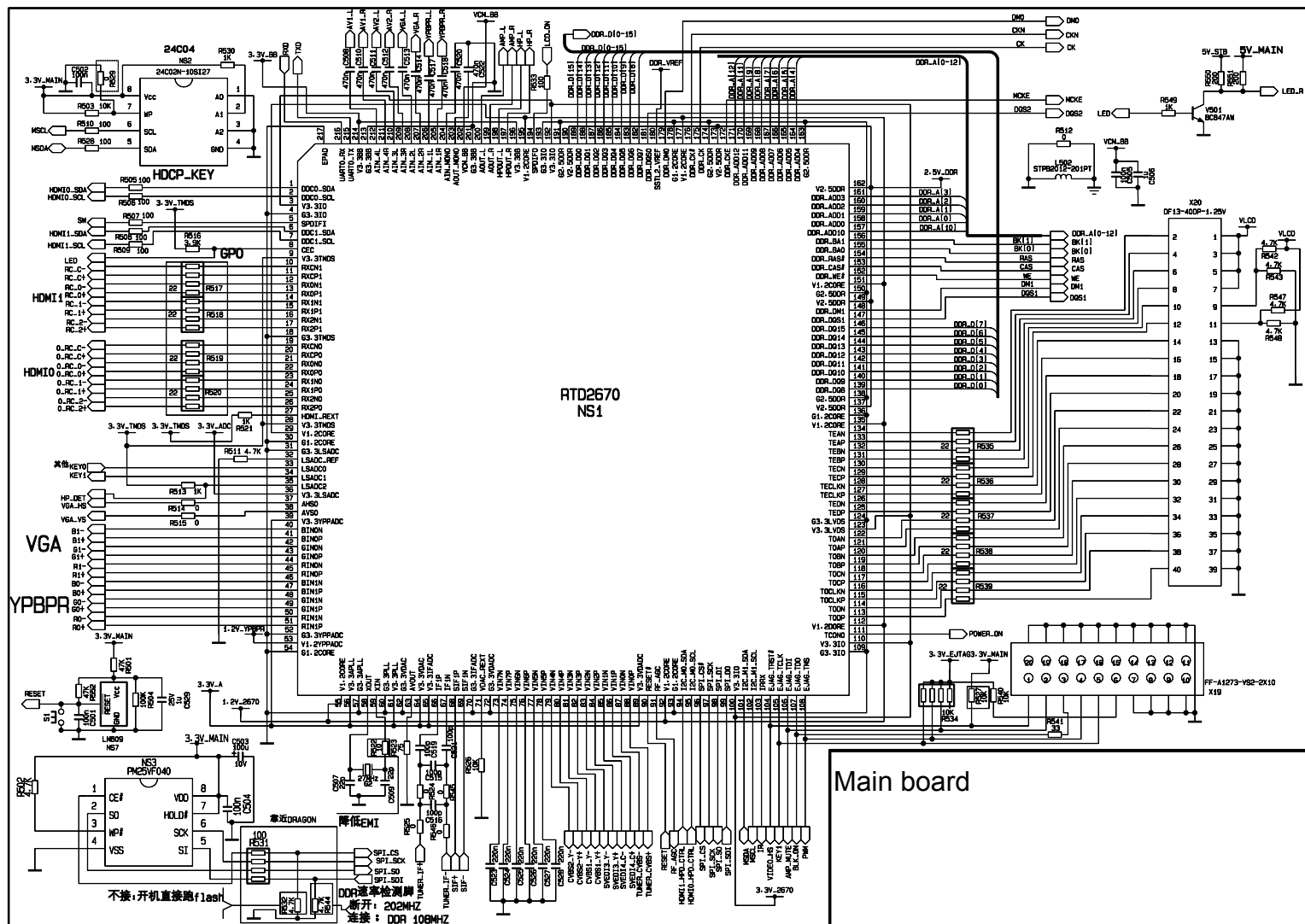


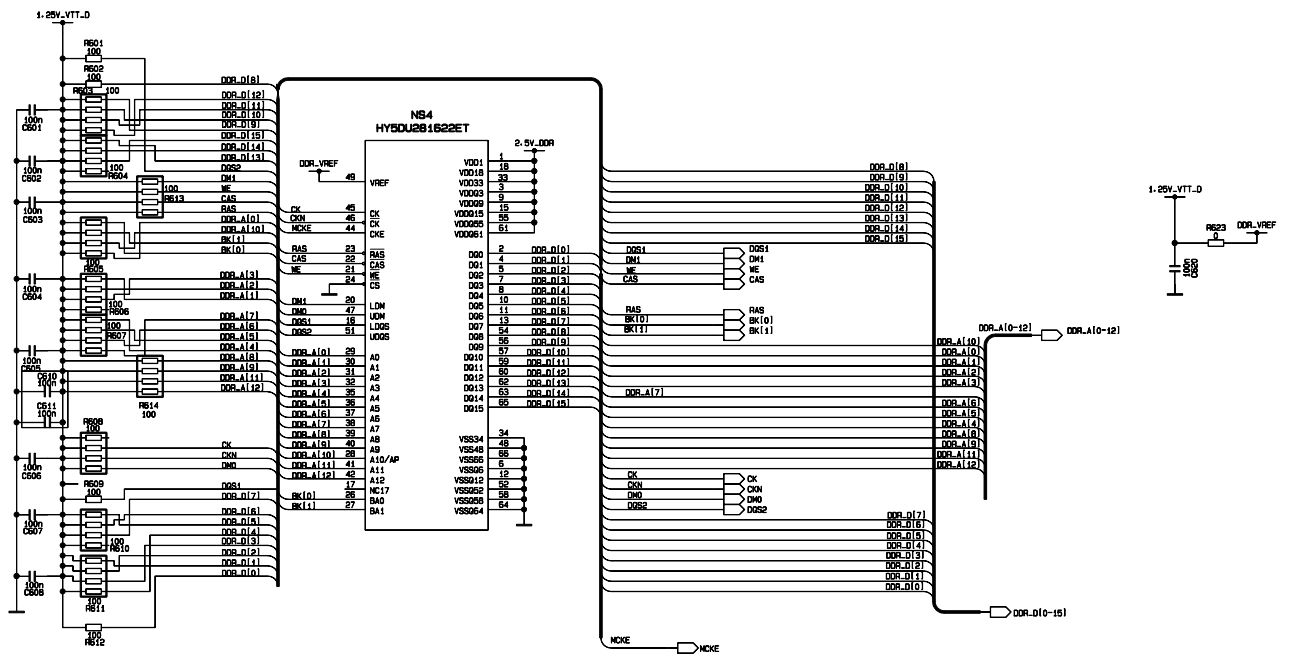


Main board

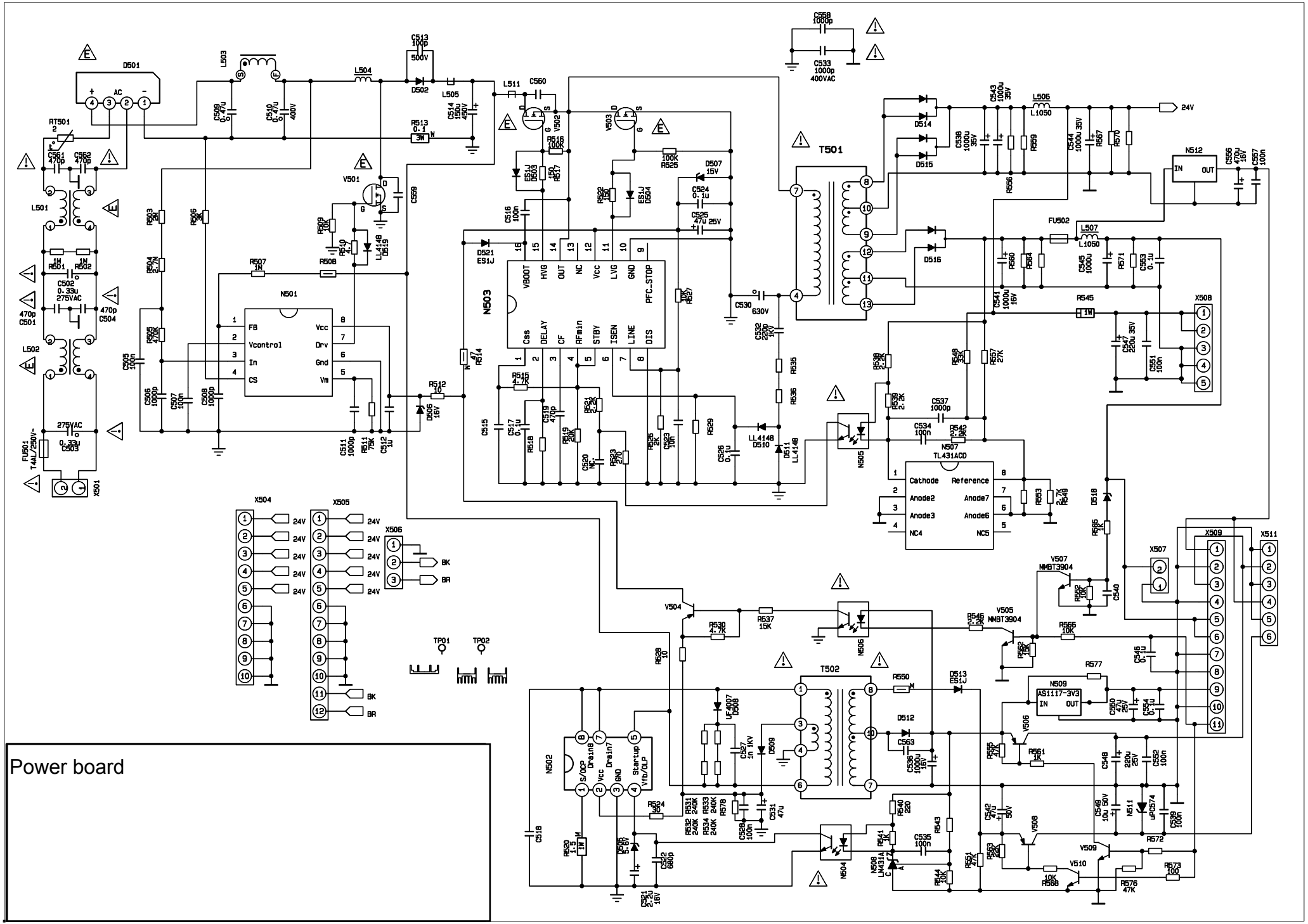








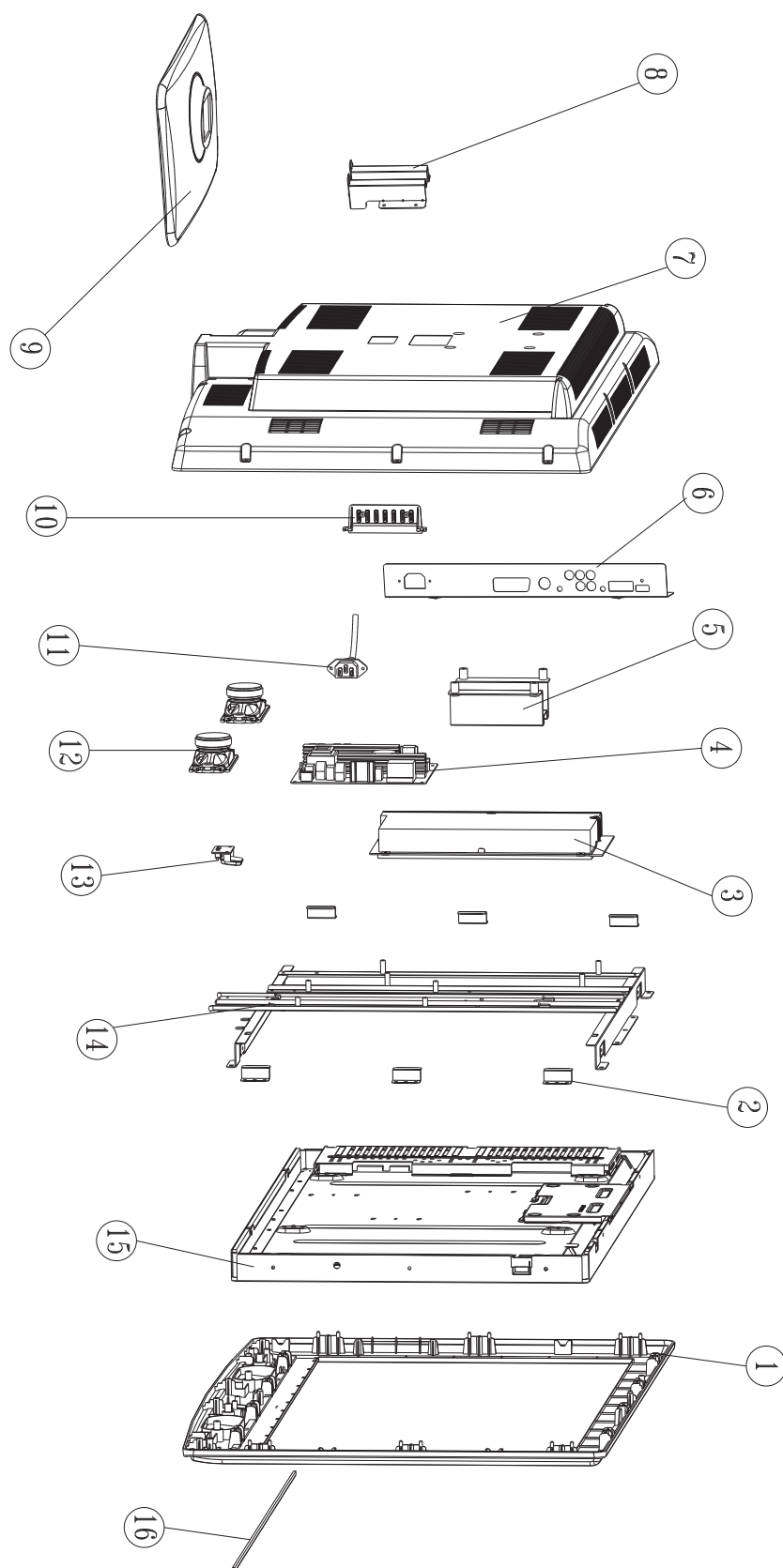
Main board



APPENDIX-A: Main assembly 9232HC5615

NAME	NO.	MAIN COMPONENT AND IT'S NO.	
Main board	6HC00901A0	NS6 NS1 NS5	R2S10401 (5271040101) RTD2670M (5272670001) TPA3120 (5273120001)
Key board	6HC00905A0		
IR board	6HC0040910		
Power board	6HC0032010		
Remote control	6010Y05600	RC-Y56	
Panel	5203325207	CLAA320WF01U	

APPENDIX-B: Exploded view (LC-32X56)



PART LIST OF EXPLODED VIEW

NO.	DESCRIPTION
1	Front cabinet
2	Panel push board
3	Main board
4	Power board
5	Wall mounting bracket
6	Interface baffle
7	Back cabinet
8	Stand column
9	Stand
10	Key board
11	Power socket
12	Speaker
13	IR board
14	LCD panel fixed bracket
15	Panel
16	Decorative bar

Note: design and specifications are subject to change without notice.

